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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/997,650	11/28/2001	Julia C. Duncan	DUNCAN 3-10-40	7404

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EXAMINER

HOGANS, DAVID L

ART UNIT	PAPER NUMBER
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2813

DATE MAILED: 02/11/2003

7

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/997,650

Applicant(s)

DUNCAN ET AL.

Examiner

David L. Hogans

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 December 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 9-12 and 14-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 9-12, 16 and 17 is/are rejected.
- 7) ☒ Claim(s) 14 and 15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

### DETAILED ACTION

This Office Action is in response to Amendment A filed on December 2, 2002.

#### *Status of Claims*

Claims 9-12 and 14-17 are pending. Claims 1-8, 13 and 18-20 are cancelled.

#### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 9, 11 and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by 6,195,191 to Osenbach et al.

In reference to Claim 9, Osenbach et al. teaches:

- forming a semiconductor substrate made of lithium (See column 7 lines 8-12; also noting Applicant's own specification, page 10 lines 8-10, that describes a semiconductor substrate that may be comprised by a material with a bandgap less than 4 electron volts)
- forming an indium doped dielectric layer over the semiconductor substrate with an indium concentration of 5 mole percent indium oxide (See column 5 lines 10-40)

In reference to Claim 11, Osenbach et al. teaches:

- forming an indium doped silicon dioxide layer (See column 5 lines 20-27)

In reference to Claim 12, Osenbach et al. teaches:

- an indium doped oxide layer having a thickness of at least 300 nm to 1500 nm  
(column 5 lines 30-40)

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over 6,195,191 to Osenbach et al. in view of 6,051,884 to Papadas.

Osenbach et al. fails to explicitly teach an indium doped dielectric layer used as an interlevel dielectric.

However, Papadas, in column 4 lines 1-6, teaches an indium doped oxide used as a interlevel dielectric (80). Furthermore, Papadas teaches that stoichiometric indium doped oxide acts as an insulator. (See column 3 lines 25-30)

It would have been obvious to one of ordinary skill in the art to modify Osenbach et al. by incorporating an indium doped oxide layer, as taught by Papadas, to form an insulating layer between multiple metal levels.

4. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over 6,195,191 to Osenbach et al. in view of Publication No. JP2001-195789.

Incorporating all arguments of Claim 9 and noting that Osenbach et al. fails to explicitly teach an indium doped dielectric layer using a PVD process employing a target that comprises silicon dioxide and indium.

However, JP2001-195789, in column 2 lines 10-20, teaches forming an indium doped oxide layer via a PVD process with a target comprised by silicon dioxide, indium and chalcogen treated zinc. Further, JP2001-195789 teaches that the silicon dioxide indium doped protective film is formed without cracks, thereby increasing production efficiency.

It would have been obvious to one of ordinary skill in the art to modify Osenbach et al. by incorporating a PVD process with a target comprised by silicon dioxide, indium and chalcogen treated zinc, as taught by JP2001-195789, to form an indium doped

Art Unit: 2813

silicon dioxide protective film without cracks, and, thereby increase production efficiency.

5. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over 6,195,191 to Osenbach et al. in view of 5,397,920 to Tran.

Incorporating all arguments of Claim 9 and noting that Osenbach et al. fails to explicitly teach a pressure ranging from 4 to 8 mtorr, a radio frequency ranging from 50 to 550 watts and a gas flow rate ranging from 10 to 35 sccm when forming an indium doped dielectric layer.

However, Tran, in column 6 lines 34-49 and column 7 lines 29-32 and lines 51-57, teaches forming an indium doped oxide layer via a pressure of 7 mtorr, a radio frequency of 300 watts and a gas flow rate of 30 sccm. Further, Tran teaches that these process limitations give a film deposition rate of 1 angstrom per second. (See column 7 lines 53-57) Furthermore, Tran's use of such processing conditions shows the formation of an oxide layer to be functional.

It would have been obvious to one of ordinary skill in the art to modify Osenbach et al. by incorporating a pressure of 7 mtorr, a radio frequency of 300 watts and a gas flow rate of 30 sccm to form an indium doped oxide, as taught by Tran, to form the

above film at a deposition rate of 1 angstrom per second. Furthermore, Tran's use of such processing conditions shows the formation of an oxide layer to be functional.

***Allowable Subject Matter***

4. Claims 14 and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

1. Applicant's arguments filed December 2, 2002, have been fully considered but they are not persuasive.

Claims 9-11 and 17

Claims 9-11 and 17 need not be addressed because Applicant used current amendments as basis for arguments.

Claims 12 and 13

The Applicant portends: 1) that Kepler and Osenbach are of divergent fields of art; 2) that Kepler and Osenbach fail to teach every claimed element and 3) that the combination of Kepler and Osenbach would be inoperable.

As to points 1 and 3, the Examiner need not address these arguments because 6,380,040 to Kepler et al. has been withdrawn as a basis for rejection.

As to point 2, the Examiner maintains that Osenbach et al. teaches all of Applicant's claimed limitations. Please see argument provided for Claim 9 above.

Claim 16

Initially, Applicant used current amendments as basis for arguments and, as such, need not be discussed.

Second, Applicant portends that the Examiner is required to provide a translation of JP2001-195789 cited in Office Action, Paper No. 5. The Examiner notes that the Applicant was provided with the references document number, country code, date, country, inventor name, classification, column and line number of relevant information, as well as with a copy of the reference. As such, the Examiner has complied with 37 CFR 1.104(d)(1) , MPEP 707.05(a) and MPEP 707.05(e).

***Conclusion***

2. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any



extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David L. Hogans whose telephone number is (703) 305-3361. The examiner can normally be reached on M-F (7:30-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on (703) 308-4940. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

dh *dh*  
January 30, 2003

*Carl Whitehead Jr.*  
CARL WHITEHEAD, JR.  
SUPERVISORY PATENT EXAMINER  
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